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# SIGMA XI QUARTERLY

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## EDITORIAL COMMITTEE

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## QUALIFICATIONS FOR MEMBERSHIP

Attention is called to the communications in the present number of the Quarterly from Professors Prosser and Richtmeyer concerning the qualifications for membership in Sigma Xi. It has long been evident to those who have the welfare of the society at heart that the questions they propound are of vital importance; that, as Professor Richtmeyer says, "the most pressing need of the Society is some method of standardizing the criteria followed in the election of new members." The editors will gladly receive communications from those who have suggestions to offer; and they urge that the subject be considered in every chapter.

It is evident that an absolute standardization of the conditions of membership will be hard to attain; but it is also equally evident that a much more uniform standard than now prevails among the different chapters can be and should be enforced. The present writer has thought much on these subjects during the past ten years, and he would beg to offer the following as his understanding of the conditions imposed by the constitution:

First: What is included in a scientific investigation?

Originality, either in the observation of new facts or in the deduction of new principles from previously known ones. No investigation should be considered as qualifying the candidate for membership that would not be accepted and published by a reputable technical journal or learned society as a real contribution to knowledge. Furthermore, investigations should not be accepted as satisfying the conditions of the constitution, unless of extraordinary merit, when there is reason for believing that the candidate will do no more research work.

Second: What is meant by aptitude for scientific work?

Originality in the observation of new facts or in the deduction of new principles from previously known ones. The compilation of a text book, for instance, unless new methods are involved, does not make the writer an investigator. Such aptitude can only be satisfactorily determined by the actual performance of investigations sufficient to satisfy the proponents that the candidate not only can but will do such work.

Third: Does the "giving promise of marked ability" as applied to undergraduates require the completion of research work?

No; but it does mean more than the mere accumulation of knowledge. It means ability to use knowledge. It means originality, comprehension, application, and scholarship. However, if the amendments to the constitution, as proposed elsewhere in the present *Quarterly*, or some modification of them, concerning associate membership are adopted the chief danger that confronts the Society in the election of new members will be largely avoided. Diligent students with a strong love for science may then be admitted to probational membership with much good to themselves and to the Society.

Fourth: How many graduates may be elected by a chapter?

As many as show the necessary qualifications by the actual performance of meritorious research work. In general, all approved candidates for the doctorate in the university, under the limitations of the constitution, should be eligible for membership; and many of the approved candidates for the master degree also.

The writer fears that, in some chapters, the conditions of faculty and graduate membership have not always been rigorously enforced. No faculty member should be considered as a candidate who does not possess the research spirit, either in the actual prosecution of research work himself or in his ability to guide and inspire students to do such work. The doctor of philosophy who has terminated his research work with his graduating thesis should, ordinarily, not be considered as eligible. Alumni membership is in a sense honorary membership, and especial care should be taken in its bestowal.

S. W. W.

An examination of the conditions which prevail in different Chapters shows that at the present date there is a rather wide divergence of opinion regarding the basis for election to membership in Sigma Xi. Some cases among recent elections are so conspicuous, that one is tempted to ask whether members are actually

familiar with the requirements of the Constitution. There are only three distinct grades of membership: faculty, graduate, and undergraduate; since both non-resident and alumni members are elected on the standards prescribed for faculty elections.

The terms under which faculty members are elected are briefly stated by the Constitution as "noteworthy achievement as an original investigator". The conditions under which a graduate may be chosen are that such a student has "by actual work exhibited an aptitude for scientific investigation." Of undergraduates, it is specified that one is eligible who "has given promise of marked ability."

Certainly no man can reasonably qualify under the limitations for faculty members who has not actually published research, and such as is more than preliminary or trivial in character. Clearly, no graduate can meet the terms of the Constitution who has not completed something specific which gives an actual concrete demonstration of his aptitude for scientific investigation. In both of these cases, the qualifications of the candidates can be established before any committee or outside individual by an exhibit of the basis on which the election is made. But the evidence offered in support of some faculty elections contains nothing that is in any sense "noteworthy" and of many graduate students it is frankly acknowledged that they have not yet finished their work but "are going to do something good". Is not the latter in fact the fulfilment of an undergraduate standard, and have we not actually reduced the limits set by our Constitution by one grade so as to elect faculty members in such cases on a graduate basis and the latter class on an undergraduate standard?

Succinctly stated, the faculty qualification calls for published research, the graduate qualification for completed research, and the undergraduate test for promise of research. An apparent exception may be found among those students of applied science whose achievement has assumed a concrete form, such as planning a great bridge, laying out an engineering plant, or producing a new type in the breeding of plants or animals, which would equally exhibit ability as an investigator, even though it be not published research in the narrow sense of the word.

Most chapters have found a marked difficulty in determining what constitutes for an undergraduate "promise of research." If a thesis is required from senior students, as is the case in many engineering and some other scientific courses, then it is not difficult to test the ability of the student as an independent worker, even

though he may be merely repeating the work of an earlier investigator. Furthermore, where the student has covered advanced courses, which demand some power to think, to assimilate results, and to present them after thorough mental transformation, then also the student can be tested as to originality and power. But certainly no elementary course gives any opportunity for trying out a student in any such fashion, and so far as the average collection of courses in the ordinary undergraduate's record is concerned, it presents nothing that tests the research promise of the individual. Few chapters conduct the rigid examination into the record of the individual student which is the habit of the Alpha Chapter. That record does not depend upon percentage results of a marking system (see *Quarter Century History*, page 23) but upon critical examination of the academic history of each individual student. Without such scrutiny any effort to select undergraduates on the basis of "promise of research" is clearly futile. H. B. W.

#### TO CHAPTER SECRETARIES

The editors have been much encouraged by the letters of approval they have received. In common with many others, they believe that the *Quarterly* can be made of much service in the attainment of the ideals of Sigma Xi. But, they must again remind its readers, in all earnestness, that its success depends upon the chapters. To those who have contributed articles, news items, and reports, the editors give their sincere thanks. But they feel somewhat discouraged in the results of the numerous appeals made to the chapter secretaries. At least three personal letters have been written to each secretary asking for chapter reports, but, so far, in the majority of cases, without result. Twelve chapters only have sent in acceptable reports. The editors are well aware that in some cases it is difficult for the secretaries to comply with the requests for all the information concerning new members, etc., under the somewhat indefinite methods which have prevailed in the past. Reports from sixteen chapters are urgently desired for the next number of the *Quarterly*, which it is hoped may be published in December, before the time of the next Convention.